



# PRODUCT INFORMATION SHEET

**MATERION**

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### 1.1. Product identifier

**Trade name or designation of the mixture** Cobalt Boron Tantalum Zirconium  
**Synonyms** None.  
**Document number** 377  
**Issue date** 05-February-2018  
**Version number** 01

### 1.2. Relevant identified uses of the substance or mixture and uses advised against

**Identified uses** Not available.  
**Uses advised against** None known.

### 1.3. Details of the supplier of the product information sheet

#### Supplier

**Company name** Materion Advanced Materials Group  
**Address** 42 Mt. Ebo Road South  
Brewster, NY 10509  
United States  
**Division**  
**Telephone** Supplier Phone 1+845.279.0900  
**e-mail** Not available.  
**Contact person** Not available.

**1.4. Emergency telephone number** Chemtrec 1+703.527.3887

## SECTION 2: Hazards identification

### 2.1. Classification of the substance or mixture

The mixture has been assessed and/or tested for its physical, health and environmental hazards and the following classification applies.

#### Classification according to Regulation (EC) No 1272/2008 as amended

##### Health hazards

Respiratory sensitisation	Category 1	H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Skin sensitisation	Category 1	H317 - May cause an allergic skin reaction.
Carcinogenicity	Category 2	H351 - Suspected of causing cancer.

##### Environmental hazards

Hazardous to the aquatic environment, long-term aquatic hazard	Category 4	H413 - May cause long lasting harmful effects to aquatic life.
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**Hazard summary** Suspected of causing cancer. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction. Prolonged exposure may cause chronic effects. Dangerous for the environment if discharged into watercourses. Occupational exposure to the substance or mixture may cause adverse health effects.

### 2.2. Label elements

#### Label according to Regulation (EC) No. 1272/2008 as amended

**Contains:** Boron, Cobalt, Tantalum, Zirconium

#### Hazard pictograms



**Signal word** Danger

## Hazard statements

H317	The Material as sold in solid form is generally not considered hazardous. However, if the process involves grinding, melting, cutting or any other process that causes a release of dust or fumes, hazardous levels of airborne particulate could be generated.
H334	May cause an allergic skin reaction.
H351	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H413	Suspected of causing cancer.
	May cause long lasting harmful effects to aquatic life.

## Precautionary statements

### Prevention

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P272	Contaminated work clothing should not be allowed out of the workplace.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P284	Wear respiratory protection.

### Response

P302 + P352	IF ON SKIN: Wash with plenty of water.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308 + P313	IF exposed or concerned: Get medical advice/attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/attention.
P342 + P311	If experiencing respiratory symptoms: Call a POISON CENTRE/doctor.
P362 + P364	Take off contaminated clothing and wash it before reuse.

### Storage

P405	Store locked up.
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### Disposal

P501	Dispose of contents/container in accordance with local/regional/national/international regulations.
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## Supplemental label information

100 % of the mixture consists of component(s) of unknown acute oral toxicity. 100 % of the mixture consists of component(s) of unknown acute dermal toxicity. 100 % of the mixture consists of component(s) of unknown acute hazards to the aquatic environment. 45 % of the mixture consists of component(s) of unknown long-term hazards to the aquatic environment.

## 2.3. Other hazards

Not a PBT or vPvB substance or mixture.

## SECTION 3: Composition/information on ingredients

### 3.2. Mixtures

#### General information

Chemical name	%	CAS-No. / EC No.	REACH Registration No.	INDEX No.	Notes
Cobalt	75 - 92	7440-48-4 231-158-0	-	027-001-00-9	
<b>Classification:</b>	Skin Sens. 1;H317, Resp. Sens. 1;H334, Carc. 2;H351, Aquatic Chronic 4;H413				
Tantalum	1 - 20	7440-25-7 231-135-5	-	-	
<b>Classification:</b>	-				
Zirconium	15 - 1	7440-67-7 231-176-9	-	040-002-00-9	
<b>Classification:</b>	Flam. Sol. 2;H228, Pyr. Sol. 1;H250, Self-heat. 1;H251, Water-React. 2;H261, Skin Irrit. 2;H315, Skin Sens. 1;H317, Eye Irrit. 2;H319, STOT SE 3;H335, STOT RE 1;H372				
Boron	0,1 - 10	7440-42-8 231-151-2	-	-	
<b>Classification:</b>	-				

#### List of abbreviations and symbols that may be used above

#: This substance has been assigned Union workplace exposure limit(s).

M: M-factor

PBT: persistent, bioaccumulative and toxic substance.

vPvB: very persistent and very bioaccumulative substance.

All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

#### Composition comments

The full text for all H-statements is displayed in section 16.

## SECTION 4: First aid measures

**General information** IF exposed or concerned: Get medical advice/attention. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

### 4.1. Description of first aid measures

**Inhalation** If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. If experiencing respiratory symptoms: Call a POISON CENTRE or doctor/physician.

**Skin contact** Remove contaminated clothing immediately and wash skin with soap and water. In case of eczema or other skin disorders: Seek medical attention and take along these instructions.

**Eye contact** Rinse with water. Get medical attention if irritation develops and persists.

**Ingestion** Rinse mouth. Get medical attention if symptoms occur.

**4.2. Most important symptoms and effects, both acute and delayed** Coughing. Difficulty in breathing. May cause an allergic skin reaction. Dermatitis. Rash.

**4.3. Indication of any immediate medical attention and special treatment needed** Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

## SECTION 5: Firefighting measures

**General fire hazards** No unusual fire or explosion hazards noted.

### 5.1. Extinguishing media

**Suitable extinguishing media** Dry powder. Dry sand.

**Unsuitable extinguishing media** Do not use water jet as an extinguisher, as this will spread the fire. Carbon dioxide (CO<sub>2</sub>).

**5.2. Special hazards arising from the substance or mixture** During fire, gases hazardous to health may be formed.

### 5.3. Advice for firefighters

**Special protective equipment for firefighters** Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

**Special firefighting procedures** Move containers from fire area if you can do so without risk.

**Specific methods** Use standard firefighting procedures and consider the hazards of other involved materials.

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

**For non-emergency personnel** Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

**For emergency responders** Keep unnecessary personnel away. Use personal protection recommended in Section 8 of the SDS.

**6.2. Environmental precautions** Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

**6.3. Methods and material for containment and cleaning up** Prevent product from entering drains. Stop the flow of material, if this is without risk. Following product recovery, flush area with water. Put material in suitable, covered, labeled containers.

**6.4. Reference to other sections** Not available.

## SECTION 7: Handling and storage

**7.1. Precautions for safe handling** Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid breathing dust/fume/gas/mist/vapours/spray. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Should be handled in closed systems, if possible. Provide adequate ventilation. Wear appropriate personal protective equipment. Avoid release to the environment. Observe good industrial hygiene practices.

**7.2. Conditions for safe storage, including any incompatibilities**

Store locked up. Store in original tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

**7.3. Specific end use(s)**

Not available.

**SECTION 8: Exposure controls/personal protection****8.1. Control parameters****Occupational exposure limits****Austria. MAK List, OEL Ordinance (GwV), BGBl. II, no. 184/2001**

Components	Type	Value	Form
Tantalum (CAS 7440-25-7)	MAK	5 mg/m <sup>3</sup>	Inhalable fraction.
Zirconium (CAS 7440-67-7)	MAK	5 mg/m <sup>3</sup>	Inhalable fraction.

**Austria. TRK List, OEL Ordinance (GwV), BGBl. II, no. 184/2001**

Components	Type	Value	Form
Cobalt (CAS 7440-48-4)	STEL	0,4 mg/m <sup>3</sup>	Inhalable fraction.
	TWA	0,1 mg/m <sup>3</sup>	Inhalable fraction.

**Belgium. Exposure Limit Values.**

Components	Type	Value	Form
Cobalt (CAS 7440-48-4)	TWA	0,02 mg/m <sup>3</sup>	Dust and fume.
Tantalum (CAS 7440-25-7)	TWA	5 mg/m <sup>3</sup>	
Zirconium (CAS 7440-67-7)	STEL	10 mg/m <sup>3</sup>	
	TWA	5 mg/m <sup>3</sup>	

**Bulgaria. OELs. Regulation No 13 on protection of workers against risks of exposure to chemical agents at work**

Components	Type	Value
Cobalt (CAS 7440-48-4)	TWA	0,1 mg/m <sup>3</sup>
Tantalum (CAS 7440-25-7)	TWA	5 mg/m <sup>3</sup>

**Croatia. Dangerous Substance Exposure Limit Values in the Workplace (ELVs), Annexes 1 and 2, Narodne Novine, 13/09**

Components	Type	Value
Cobalt (CAS 7440-48-4)	MAC	0,1 mg/m <sup>3</sup>
Tantalum (CAS 7440-25-7)	MAC	5 mg/m <sup>3</sup>
	STEL	10 mg/m <sup>3</sup>
	MAC	5 mg/m <sup>3</sup>
Zirconium (CAS 7440-67-7)	MAC	5 mg/m <sup>3</sup>
	STEL	10 mg/m <sup>3</sup>

**Cyprus. OELs. Control of factory atmosphere and dangerous substances in factories regulation, PI 311/73, as amended.**

Components	Type	Value	Form
Cobalt (CAS 7440-48-4)	TWA	0,1 mg/m <sup>3</sup>	Dust and fume.
Zirconium (CAS 7440-67-7)	TWA	5 mg/m <sup>3</sup>	

**Czech Republic. OELs. Government Decree 361**

Components	Type	Value	Form
Cobalt (CAS 7440-48-4)	Ceiling	0,1 mg/m <sup>3</sup>	
	TWA	0,05 mg/m <sup>3</sup>	
	TWA	5 mg/m <sup>3</sup>	Dust.

**Denmark. Exposure Limit Values**

Components	Type	Value	Form
Cobalt (CAS 7440-48-4)	TLV	0,01 mg/m <sup>3</sup>	Dust and fume.
Tantalum (CAS 7440-25-7)	TLV	5 mg/m <sup>3</sup>	Dust.

**Estonia. OELs. Occupational Exposure Limits of Hazardous Substances. (Annex of Regulation No. 293 of 18 September 2001)**

Components	Type	Value	Form
Cobalt (CAS 7440-48-4)	TWA	0,05 mg/m <sup>3</sup>	
Tantalum (CAS 7440-25-7)	TWA	5 mg/m <sup>3</sup>	Respirable dust.
		10 mg/m <sup>3</sup>	Total dust.
		1 mg/m <sup>3</sup>	Dust.

**Finland. Workplace Exposure Limits**

Components	Type	Value
Cobalt (CAS 7440-48-4)	TWA	0,02 mg/m <sup>3</sup>

**Finland. Workplace Exposure Limits**

Components	Type	Value
Tantalum (CAS 7440-25-7)	TWA	5 mg/m3
Zirconium (CAS 7440-67-7)	TWA	1 mg/m3

**France. Threshold Limit Values (VLEP) for Occupational Exposure to Chemicals in France, INRS ED 984**

Components	Type	Value
Tantalum (CAS 7440-25-7)	VME	5 mg/m3

**Germany. DFG MAK List (advisory OELs). Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area (DFG)**

Components	Type	Value	Form
Boron (CAS 7440-42-8)	TWA	0,75 mg/m3	Inhalable fraction.
Tantalum (CAS 7440-25-7)	TWA	4 mg/m3	Inhalable fraction.
Zirconium (CAS 7440-67-7)	TWA	1 mg/m3	Inhalable fraction.

**Germany. TRGS 900, Limit Values in the Ambient Air at the Workplace**

Components	Type	Value	Form
Tantalum (CAS 7440-25-7)	AGW	10 mg/m3 1,25 mg/m3	Inhalable fraction. Respirable fraction.
Zirconium (CAS 7440-67-7)	AGW	1 mg/m3	Inhalable fraction.

**Greece. OELs (Decree No. 90/1999, as amended)**

Components	Type	Value	Form
Cobalt (CAS 7440-48-4)	TWA	0,1 mg/m3	Dust and fume.
Tantalum (CAS 7440-25-7)	STEL	10 mg/m3	
	TWA	5 mg/m3	
Zirconium (CAS 7440-67-7)	STEL	10 mg/m3	
	TWA	5 mg/m3	

**Hungary. OELs. Joint Decree on Chemical Safety of Workplaces**

Components	Type	Value	Form
Cobalt (CAS 7440-48-4)	STEL	0,4 mg/m3	
	TWA	0,1 mg/m3	
Tantalum (CAS 7440-25-7)	TWA	6 mg/m3 10 mg/m3	Respirable dust. Total inhalable dust.
Zirconium (CAS 7440-67-7)	STEL	20 mg/m3	
	TWA	5 mg/m3	

**Iceland. OELs. Regulation 154/1999 on occupational exposure limits**

Components	Type	Value	Form
Cobalt (CAS 7440-48-4)	TWA	0,02 mg/m3	Dust and fume.
Tantalum (CAS 7440-25-7)	TWA	5 mg/m3	Dust.
Zirconium (CAS 7440-67-7)	TWA	5 mg/m3	

**Ireland. Occupational Exposure Limits**

Components	Type	Value
Cobalt (CAS 7440-48-4)	TWA	0,1 mg/m3
Tantalum (CAS 7440-25-7)	STEL	10 mg/m3
	TWA	5 mg/m3

**Italy. Occupational Exposure Limits**

Components	Type	Value
Cobalt (CAS 7440-48-4)	TWA	0,02 mg/m3
Zirconium (CAS 7440-67-7)	STEL	10 mg/m3
	TWA	5 mg/m3

**Latvia. OELs. Occupational exposure limit values of chemical substances in work environment**

Components	Type	Value	Form
Cobalt (CAS 7440-48-4)	TWA	0,5 mg/m3	
Tantalum (CAS 7440-25-7)	TWA	2 mg/m3 2 mg/m3	Dust.

**Lithuania. OELs. Limit Values for Chemical Substances, General Requirements**

Components	Type	Value
Cobalt (CAS 7440-48-4)	TWA	0,05 mg/m3
Tantalum (CAS 7440-25-7)	TWA	10 mg/m3

**Lithuania. OELs. Limit Values for Chemical Substances, General Requirements**

Components	Type	Value
Zirconium (CAS 7440-67-7)	TWA	6 mg/m <sup>3</sup>

**Netherlands. OELs (binding)**

Components	Type	Value	Form
Cobalt (CAS 7440-48-4)	TWA	0,02 mg/m <sup>3</sup>	Dust and fume.

**Norway. Administrative Norms for Contaminants in the Workplace**

Components	Type	Value	Form
Cobalt (CAS 7440-48-4)	TLV	0,02 mg/m <sup>3</sup>	Fume.
Tantalum (CAS 7440-25-7)	TLV	5 mg/m <sup>3</sup>	Respirable dust.
		10 mg/m <sup>3</sup>	Total dust.

**Poland. MACs. Regulation regarding maximum permissible concentrations and intensities of harmful factors in the work environment, Annex 1**

Components	Type	Value
Cobalt (CAS 7440-48-4)	TWA	0,02 mg/m <sup>3</sup>
Tantalum (CAS 7440-25-7)	TWA	5 mg/m <sup>3</sup>
Zirconium (CAS 7440-67-7)	STEL	10 mg/m <sup>3</sup>
	TWA	5 mg/m <sup>3</sup>

**Portugal. VLEs. Norm on occupational exposure to chemical agents (NP 1796)**

Components	Type	Value	Form
Cobalt (CAS 7440-48-4)	TWA	0,02 mg/m <sup>3</sup>	Dust.
Tantalum (CAS 7440-25-7)	TWA	5 mg/m <sup>3</sup>	
Zirconium (CAS 7440-67-7)	STEL	10 mg/m <sup>3</sup>	
	TWA	5 mg/m <sup>3</sup>	

**Romania. OELs. Protection of workers from exposure to chemical agents at the workplace**

Components	Type	Value
Cobalt (CAS 7440-48-4)	STEL	0,1 mg/m <sup>3</sup>
	TWA	0,05 mg/m <sup>3</sup>
Tantalum (CAS 7440-25-7)	STEL	10 mg/m <sup>3</sup>
	TWA	5 mg/m <sup>3</sup>
Zirconium (CAS 7440-67-7)	STEL	10 mg/m <sup>3</sup>
	TWA	5 mg/m <sup>3</sup>

**Slovakia. OELs. Regulation No. 300/2007 concerning protection of health in work with chemical agents**

Components	Type	Value	Form
Cobalt (CAS 7440-48-4)	TWA	0,05 mg/m <sup>3</sup>	Inhalable fraction. Respirable fraction.
Tantalum (CAS 7440-25-7)	TWA	4 mg/m <sup>3</sup>	
		1,5 mg/m <sup>3</sup>	
Zirconium (CAS 7440-67-7)	TWA	1 mg/m <sup>3</sup>	

**Slovenia. OELs. Regulations concerning protection of workers against risks due to exposure to chemicals while working (Official Gazette of the Republic of Slovenia)**

Components	Type	Value	Form
Cobalt (CAS 7440-48-4)	TWA	0,1 mg/m <sup>3</sup>	Inhalable fraction.
Zirconium (CAS 7440-67-7)	TWA	1 mg/m <sup>3</sup>	Inhalable dust.

**Spain. Occupational Exposure Limits**

Components	Type	Value	Form
Cobalt (CAS 7440-48-4)	TWA	0,02 mg/m <sup>3</sup>	Respirable fraction. Inhalable fraction.
Tantalum (CAS 7440-25-7)	TWA	3 mg/m <sup>3</sup>	
		10 mg/m <sup>3</sup>	
Zirconium (CAS 7440-67-7)	STEL	10 mg/m <sup>3</sup>	
	TWA	5 mg/m <sup>3</sup>	

**Sweden. OELs. Work Environment Authority (AV), Occupational Exposure Limit Values (AFS 2015:7)**

Components	Type	Value	Form
Cobalt (CAS 7440-48-4)	TWA	0,02 mg/m <sup>3</sup>	Inhalable dust.
Tantalum (CAS 7440-25-7)	TWA	5 mg/m <sup>3</sup>	Respirable dust.
		10 mg/m <sup>3</sup>	Inhalable dust.

**Switzerland. SUVA Grenzwerte am Arbeitsplatz**

Components	Type	Value	Form
Cobalt (CAS 7440-48-4)	TWA	0,05 mg/m <sup>3</sup>	Dust/aerosol, inhalable.
Tantalum (CAS 7440-25-7)	TWA	5 mg/m <sup>3</sup>	Inhalable dust.

**UK. EH40 Workplace Exposure Limits (WELs)**

Components	Type	Value
Cobalt (CAS 7440-48-4)	TWA	0,1 mg/m <sup>3</sup>
Tantalum (CAS 7440-25-7)	STEL	10 mg/m <sup>3</sup>
	TWA	5 mg/m <sup>3</sup>

**Biological limit values****Finland. HTP-arvot, App 2., Biological Limit Values, (BRA/BGV) , Social Affairs and Ministry of Health**

Components	Value	Determinant	Specimen	Sampling time
Cobalt (CAS 7440-48-4)	130 nmol/l	Cobalt	Urine	*

\* - For sampling details, please see the source document.

**France. Biological indicators of exposure (IBE) (National Institute for Research and Security (INRS, ND 2065)**

Components	Value	Determinant	Specimen	Sampling time
Cobalt (CAS 7440-48-4)	15 µg/l	Cobalt	Urine	*
	1 µg/l	Cobalt	Blood	*

\* - For sampling details, please see the source document.

**Hungary. Chemical Safety at Workplace Ordinance Joint Decree No. 25/2000 (Annex 2): Permissible limit values of biological exposure (effect) indices**

Components	Value	Determinant	Specimen	Sampling time
Cobalt (CAS 7440-48-4)	0,03 mg/g	Cobalt	Creatinine in urine	*
	0,058 µmol/mmol	Cobalt	Creatinine in urine	*

\* - For sampling details, please see the source document.

**Slovakia. BLVs (Biological Limit Value). Regulation no. 355/2006 concerning protection of workers exposed to chemical agents, Annex 2**

Components	Value	Determinant	Specimen	Sampling time
Cobalt (CAS 7440-48-4)	20,03 µg/g	Cobalt	Creatinine in urine	*
	30 µg/l	Cobalt	Urine	*

\* - For sampling details, please see the source document.

**Spain. Biological Limit Values (VLBs), Occupational Exposure Limits for Chemical Agents, Table 4**

Components	Value	Determinant	Specimen	Sampling time
Cobalt (CAS 7440-48-4)	15 µg/l	Cobalto	Urine	*
	1 µg/l	Cobalto	Blood	*

\* - For sampling details, please see the source document.

**Switzerland. BAT-Werte (Biological Limit Values in the Workplace as per SUVA)**

Components	Value	Determinant	Specimen	Sampling time
Cobalt (CAS 7440-48-4)	30 µg/l	Cobalt	Urine	*

\* - For sampling details, please see the source document.

**Recommended monitoring procedures** Follow standard monitoring procedures.

**Derived no effect levels (DNELs)** Not available.

**Predicted no effect concentrations (PNECs)** Not available.

**8.2. Exposure controls**

**Appropriate engineering controls** Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. General ventilation normally adequate.

## Individual protection measures, such as personal protective equipment

<b>General information</b>	Use personal protective equipment as required. Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment.
<b>Eye/face protection</b>	If contact is likely, safety glasses with side shields are recommended.
<b>Skin protection</b>	
- <b>Hand protection</b>	Wear appropriate chemical resistant gloves.
- <b>Other</b>	Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.
<b>Respiratory protection</b>	Wear positive pressure self-contained breathing apparatus (SCBA).
<b>Thermal hazards</b>	Wear appropriate thermal protective clothing, when necessary.

**Hygiene measures** Observe any medical surveillance requirements. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Contaminated work clothing should not be allowed out of the workplace.

**Environmental exposure controls** Inform appropriate managerial or supervisory personnel of all environmental releases.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

#### Appearance

<b>Physical state</b>	Solid.
<b>Form</b>	Solid.
<b>Colour</b>	Not available.

**Odour** Not available.

**Odour threshold** Not available.

**pH** Not available.

**Melting point/freezing point** 1495 °C (2723 °F) estimated

**Initial boiling point and boiling range** 2927 °C (5300,6 °F) estimated

**Flash point** Not available.

**Evaporation rate** Not available.

**Flammability (solid, gas)** Not available.

#### Upper/lower flammability or explosive limits

**Flammability limit - lower (%)** Not available.

**Flammability limit - upper (%)** Not available.

**Vapour pressure** 0,00001 hPa estimated

**Vapour density** Not available.

**Relative density** Not available.

#### Solubility(ies)

**Solubility (water)** Not available.

**Partition coefficient (n-octanol/water)** Not available.

**Auto-ignition temperature** 200 °C (392 °F) estimated

**Decomposition temperature** Not available.

**Viscosity** Not available.

**Explosive properties** Not explosive.

**Oxidising properties** Not oxidising.

### 9.2. Other information

**Density** 11,15 g/cm<sup>3</sup> estimated

**Specific gravity** 11,15 estimated

## SECTION 10: Stability and reactivity

**10.1. Reactivity** The product is stable and non-reactive under normal conditions of use, storage and transport.

**10.2. Chemical stability** Material is stable under normal conditions.



<b>10.3. Possibility of hazardous reactions</b>	No dangerous reaction known under conditions of normal use.
<b>10.4. Conditions to avoid</b>	Contact with incompatible materials.
<b>10.5. Incompatible materials</b>	Strong oxidising agents. Fluorine.
<b>10.6. Hazardous decomposition products</b>	No hazardous decomposition products are known.

## SECTION 11: Toxicological information

**General information** Occupational exposure to the substance or mixture may cause adverse effects.

### Information on likely routes of exposure

<b>Inhalation</b>	May cause allergy or asthma symptoms or breathing difficulties if inhaled. Prolonged inhalation may be harmful.
<b>Skin contact</b>	May cause an allergic skin reaction.
<b>Eye contact</b>	Direct contact with eyes may cause temporary irritation.
<b>Ingestion</b>	May cause discomfort if swallowed. However, ingestion is not likely to be a primary route of occupational exposure.

**Symptoms** Coughing. Difficulty in breathing. May cause an allergic skin reaction. Dermatitis. Rash.

### 11.1. Information on toxicological effects

<b>Acute toxicity</b>	Not known.
<b>Skin corrosion/irritation</b>	Due to partial or complete lack of data the classification is not possible.
<b>Serious eye damage/eye irritation</b>	Due to partial or complete lack of data the classification is not possible.
<b>Respiratory sensitisation</b>	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
<b>Skin sensitisation</b>	May cause an allergic skin reaction.
<b>Germ cell mutagenicity</b>	Due to partial or complete lack of data the classification is not possible.
<b>Carcinogenicity</b>	Suspected of causing cancer.

#### Hungary. 26/2000 EüM Ordinance on protection against and preventing risk relating to exposure to carcinogens at work (as amended)

Not listed.

#### IARC Monographs. Overall Evaluation of Carcinogenicity

Cobalt (CAS 7440-48-4)

2B Possibly carcinogenic to humans.

<b>Reproductive toxicity</b>	Due to partial or complete lack of data the classification is not possible.
<b>Specific target organ toxicity - single exposure</b>	Due to partial or complete lack of data the classification is not possible.
<b>Specific target organ toxicity - repeated exposure</b>	Due to partial or complete lack of data the classification is not possible.
<b>Aspiration hazard</b>	Due to partial or complete lack of data the classification is not possible.
<b>Mixture versus substance information</b>	No information available.
<b>Other information</b>	Not available.

## SECTION 12: Ecological information

<b>12.1. Toxicity</b>	May cause long lasting harmful effects to aquatic life. Based on available data, the classification criteria are not met for hazardous to the aquatic environment, acute hazard.
<b>12.2. Persistence and degradability</b>	
<b>12.3. Bioaccumulative potential</b>	No data available.
<b>Partition coefficient n-octanol/water (log Kow)</b>	Not available.
<b>Bioconcentration factor (BCF)</b>	Not available.
<b>12.4. Mobility in soil</b>	No data available.
<b>12.5. Results of PBT and vPvB assessment</b>	Not a PBT or vPvB substance or mixture.
<b>12.6. Other adverse effects</b>	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

## 12.7. Additional information

### Estonia Dangerous substances in groundwater Data

Boron (CAS 7440-42-8)

Boron (B) 2000 UG/L

Boron (B) 500 UG/L

Cobalt (CAS 7440-48-4)

Cobalt (Co) 300 UG/L

Cobalt (Co) 5 UG/L

### Estonia Dangerous substances in soil Data

Boron (CAS 7440-42-8)

Boron (B) 100 mg/kg

Boron (B) 30 mg/kg

Boron (B) 500 mg/kg

Cobalt (CAS 7440-48-4)

Cobalt (Co) 20 mg/kg

Cobalt (Co) 300 mg/kg

Cobalt (Co) 50 mg/kg

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

#### Residual waste

Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

#### Contaminated packaging

Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

#### EU waste code

The Waste code should be assigned in discussion between the user, the producer and the waste disposal company.

#### Disposal methods/information

Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

#### Special precautions

Dispose in accordance with all applicable regulations.

## SECTION 14: Transport information

### ADR

14.1. UN number UN3178

14.2. UN proper shipping name Flammable solid, inorganic, n.o.s. (Zirconium)

#### 14.3. Transport hazard class(es)

Class 4.1

Subsidiary risk -

Label(s) 4.1

Hazard No. (ADR) 40

Tunnel restriction code E

14.4. Packing group III

14.5. Environmental hazards No.

14.6. Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

### RID

14.1. UN number UN3178

14.2. UN proper shipping name Flammable solid, inorganic, n.o.s. (Zirconium)

#### 14.3. Transport hazard class(es)

Class 4.1

Subsidiary risk -

Label(s) 4.1

14.4. Packing group III

14.5. Environmental hazards No.

14.6. Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

### ADN

14.1. UN number UN3178

14.2. UN proper shipping name Flammable solid, inorganic, n.o.s. (Zirconium)

### 14.3. Transport hazard class(es)

**Class** 4.1

**Subsidiary risk** -

**Label(s)** 4.1

**14.4. Packing group** III

**14.5. Environmental hazards** No.

**14.6. Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.

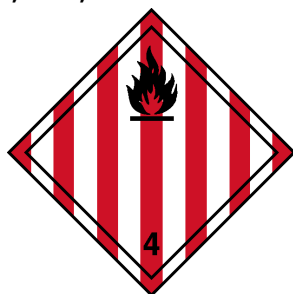
### IATA

14.1. - 14.6.: Not regulated as dangerous goods.

### IMDG

14.1. - 14.6.: Not regulated as dangerous goods.

### ADN; ADR; RID



## SECTION 15: Regulatory information

### 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

#### EU regulations

**Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I and II, as amended**

Not listed.

**Regulation (EC) No. 850/2004 On persistent organic pollutants, Annex I as amended**

Not listed.

**Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 1 as amended**

Not listed.

**Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 2 as amended**

Not listed.

**Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 3 as amended**

Not listed.

**Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex V as amended**

Not listed.

**Regulation (EC) No. 166/2006 Annex II Pollutant Release and Transfer Registry, as amended**

Not listed.

**Regulation (EC) No. 1907/2006, REACH Article 59(10) Candidate List as currently published by ECHA**

Not listed.

#### Authorisations

**Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorization, as amended**

Not listed.

#### Restrictions on use

**Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended**

Zirconium (CAS 7440-67-7)

**Directive 2004/37/EC: on the protection of workers from the risks related to exposure to carcinogens and mutagens at work, as amended.**

Not listed.

#### Other EU regulations

**Directive 2012/18/EU on major accident hazards involving dangerous substances, as amended**

Zirconium (CAS 7440-67-7)

**Other regulations**

Pregnant women should not work with the product, if there is the least risk of exposure. The product is classified and labelled in accordance with Regulation (EC) 1272/2008 (CLP Regulation) as amended. Additional information is given in the Safety Data Sheet.

**National regulations**

Follow national regulation for work with chemical agents. Young people under 18 years old are not allowed to work with this product according to EU Directive 94/33/EC on the protection of young people at work, as amended.

**15.2. Chemical safety assessment**

No Chemical Safety Assessment has been carried out.

**SECTION 16: Other information****List of abbreviations**

Not available.

**Information on evaluation method leading to the classification of mixture**

The classification for health and environmental hazards is derived by a combination of calculation methods and test data, if available.

**Disclaimer**

Materion Advanced Materials Group cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. To avoid any misunderstandings or incorrect assumptions by the receiver of the safety information, it should be made clear that the supplied information is not in the form of a Safety Data Sheet (SDS), but is actually a voluntary Product Information Sheet closely following the guidelines of the Safety Data Sheet – COMMISSION REGULATION (EU) No 453/2010 of 20 May 2010 (REACH/SDS).